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Where are we short and who are we short of? A review of the human resources for health in South Africa

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This review showed that thinking about the *shortage* of health care personnel merely in terms of insufficient numbers prevents sound strategic interventions to solve the country's human resources for health (HRH) problem. It revealed that the numbers shortage was one facet of a broader problem that included the mal distribution of HRH, production of the wrong skills in the nursing care, the attrition of staff from the public health services and, contextually, the ever-changing demands on the health services. The challenge in South Africa was furthermore to train and retain health care personnel with skills and expertise that are commensurate with the changing demands on the public health services.

Uit hierdie oorsig het dit duidelik geblyk dat die *tekort* van gesondheidsorgpersoneel slegs in terme van ontoereikende getalle val en 'n omvattende strategiese ingryping om die land se menslike gesondheidshulpbron krisis op te los, belemmer. Dit het aangedui dat die getalletekort maar slegs een faset van 'n groter probleem uitmaak, wat onder andere die volgende insluit: die oneweredige verspeiding van menslike gesondheidshulpbronne, 'n fokus op ontoepaslike vaardighede in die opleiding van verpleegpersoneel, die behoud van personeel in die openbare gesondheidssektor, asook die konstant-veranderlike eise van die gesondheidsdienste. Verder was die uitdaging in Suid Afrika die opleiding en behoud van gesondheidsorgpersoneel met kennis en vaardighede wat tred hou met die veranderlike eise van die openbare gesondheidsdienste.

Introduction

International agencies support a health system strengthening agenda in developing countries within strategic initiatives to promote the integration of HIV and AIDS programmes into general health programmes (Pfeiffer, Montoya, Baptista, Karagianis, Pugas, Mde, *et al.* 2010; WHO 2005, 2007) and, more recently, to revitalise the principles and practice of primary health care (PHC) (Frenk 2009; Lawn *et al.* 2008; WHO 2010). One facet of this agenda is to ensure an adequate number of appropriately skilled health care personnel to deliver services. Assessments to date have highlighted the *shortage* of personnel in many African countries. The general baseline is the projection of the World Health Organization (WHO) that there should be a minimum of 230 health professionals per 100 000 people (WHO 2006a, 2006b).

The WHO's assessment revealed a critical shortage of health care personnel in 36 (78%) of the countries in Africa, representing the majority (63%) of all countries in the world where this is the case. However, it has become evident that *shortage* cannot mean simply insufficient numbers of health care personnel. The case of South Africa illustrates this issue. Firstly, the WHO's (2006a) assessment summarised below, shows that South Africa exceeded the minimum ratios of 20 medical practitioners and 120 nurses respectively per 100 000 people (Table 1). Calculations for 2010 of the number of general practitioners (GPs) and specialists working in South Africa show that there are 17 801 GPs and 9630 specialists (Econex 2010a). These figures imply a doctor to patient ratio of 62:100 000 people.

Secondly, a World Bank assessment that includes economic criteria, reported that South Africa, as a middle-income country, should have a general ratio of 180 doctors per 100 000 people. However, the actual ratio is closer to what would be expected for a low-income country (50:100 000) and it is much lower than equivalent middle-income developing countries such as Mexico (198 per 100 000) and Brazil (185 per 100 000) (Econex 2010a).

Thirdly, local assessments of HRH in South Africa have highlighted the skewed distribution of human resources between the public and private health sectors and between rural and urban areas, and the changing demands on the public health services following the introduction and expansion of the national antiretroviral treatment (ART) programme in 2004 and integration of



HIV and AIDS programmes into general health programmes (Bateman 2007; Breier 2009; Couper, De Cilliers & Sondzaba 2005; Lehmann 2008; McIntyre & Klugman 2003; Schneider *et al.* 2006; Sanders & Lloyd 2009; Shishana *et al.* 2004; Van Rensburg *et al.* 2008).

In sum, South Africa has a *shortage* of health care personnel. The HRH for the Health Sector Strategy: 2012 and 2013–2016 and 2007 of the national Department of Health (DoH), duly acknowledges some aspects of previous local assessments—but of some concern, still emphasises the need broadly to employ more staff (DoH 2011).

Objectives

Our objective is to show why the HRH constraints in South Africa cannot be viewed primarily as insufficient numbers of health care personnel. To be clear, we do not deny that there is a numerical shortage of staff in the public health service. However, it is one facet of a broader HRH problem that includes inadequate harnessing of health professionals' skills and expertise, the production of inappropriate skills, particularly in the nursing care, and ongoing and high levels of staff attrition.

Our analysis is informed by the changing burden of disease and the changing demands on the health services. We refer to changes as a result of expansion of the national ART programme (more people in need of comprehensive care and continuum of care), health technology interventions (e.g. male circumcision) and innovations (e.g. integration of community home-based care (CHBC) programmes into PHC services), and the changing needs of HIV patients (e.g. more demand for support services and less need for home-based care). Detailed discussion of these contextual factors is beyond the scope of this article, but they should be kept in mind as significant factors that should inform any strategy to resolve the HRH problem in this country.

Research methods and design

Methods

This article is derived from an HRH situational assessment conducted in 2009 over a period of three months (George, Quinlan & Reardon 2009) in relation to the HIV and AIDS national strategic plan (NSP) for 2007–2011,¹ and updated following the publication of the HRH for the Health Sector Strategy: 2012 and 2013–2016 and 2017 in 2011. This was a desk-top review. Analysis was founded on the Day and Gray's (2008) typology of four *imbalances* for examining the shortage and the distribution of HRH in a health system, namely profession or speciality, geographic, institutional and service and demographic imbalances.

As Day and Gray (2008) warned, precise disaggregation of South Africa's HRH data according to this typology is difficult. We investigated anomalies in the large, yet fragmented, body of information, to try to resolve those difficulties. In turn, that

investigation led to re-appraisal of what was meant by the HRH *shortage*. Key referents included the NSP as well as past and current health and human resource policies and plans.

Results

The numbers and distribution of professional staff

Hamilton and Yau (2004) reported that 46% of the population lived in rural areas but, in the early 2000s, they were served by only 12% of the country's doctors and 19% of nurses. Four years later, Day and Gray (2008) reported that 30% of the country's medical practitioners and 15.5% of pharmacists were employed in the public health sector but they served an estimated 85% of the population.

In the early 2000s all nine provinces had medical practitioner to people ratios that were higher than the WHO minimum

TABLE 1: Cross-country comparison of physician and nurse ratios per 100 000 population.

Country	Ratio per 100 000 people	
	Medical practitioner	Nurse and midwifery
Lesotho	5	60
Brazil	185	290
Mexico	198	400
Greece	500	350
South Africa	55	383
United States of America (USA)	256	980
Australia	247	1090

Source: Econex (2010b; 2010c).

TABLE 2: Ratio of medical practitioners per 100 000 population across provinces, 2001, 2004 and 2010.

Province	Year		
	2001	2004	2010
Gauteng	173	126	102
Western Cape	182	147	135
KwaZulu-Natal	70	52	53
Free State	69	54	55
Northern Cape	54	42	37
Mpumalanga	42	30	50
Eastern Cape	34	27	31
North West	30	23	20
Limpopo	21	18	17

Sources: Econex (2010b); Hall and Erasmus (2003); HPCSA 2004 data cited in Breier and Wildschut (2006)

TABLE 3: Ratio of professional nurses per 100 000 population across provinces, 2006 and 2008.

Province	Year	
	2006	2008
Gauteng	565	529
Western Cape	543	512
KwaZulu-Natal	456	492
Free State	387	410
Northern Cape	370	339
Mpumalanga	286	290
Eastern Cape	289	328
North West	336	403
Limpopo	303	365
Total	414	436

Source: South African Nursing Council (SANC) (2008, 2009)

1. The report is in the public domain: <http://www.heard.org.za>

**TABLE 4:** Percentage of vacant posts in public health sector for health professionals, medical practitioners, and professional nurses.

Year	Percentage in South African provinces									
	GP	WC	KZN	FS	NC	MP	EC	NW	LP	SA
Posts vacant as health professional										
2002	47.4	34.7	35.6	48.9	45.2	38.6	51.6	50.5	30.1	42.5
2003	31.9	13.8	24.5	40.7	27.3	67.4	28.4	33.0	13.4	31.1
2005	26.7	8.1	29.6	40.5	35.1	43.9	26.6	23.1	15.8	27.2
2006	24.2	16.9	32.4	40.4	37.8	43.1	32.6	23.1	16.4	29.0
2007	32.8	18.7	35.6	41.9	41.8	42.5	33.3	41.9	20.0	33.3
2008	28.1	23.3	33.3	50.7	36.3	37.6	48.0	11.6	42.1	35.7
Posts vacant as medical practitioner										
2006	20.9	12.6	34.3	33.6	53.4	38.5	36.1	29.9	26.8	29.9
2007	27.4	14.8	39.5	35.0	51.1	41.8	32.7	42.8	31.6	34.1
2008	29.4	17.4	36.7	33.8	60.2	51.3	40.1	21.3	35.4	34.4
Posts vacant as professional nurse										
2006	26.0	22.0	42.5	31.4	33.2	40.0	34.0	22.8	15.0	31.5
2007	39.9	23.8	42.1	35.7	35.9	40.2	35.8	42.2	20.0	36.3
2008	34.4	31.0	39.6	51.6	25.3	29.8	53.6	13.2	43.7	40.3

Source: Health Systems Trust (2009).

EC, Eastern Cape; FS, Free State; GP, Gauteng; KZN, KwaZulu-Natal; LP, Limpopo; MP, Mpumalanga; NC, Northern Cape; NW, North West; WC, Western Cape; SA, South Africa.

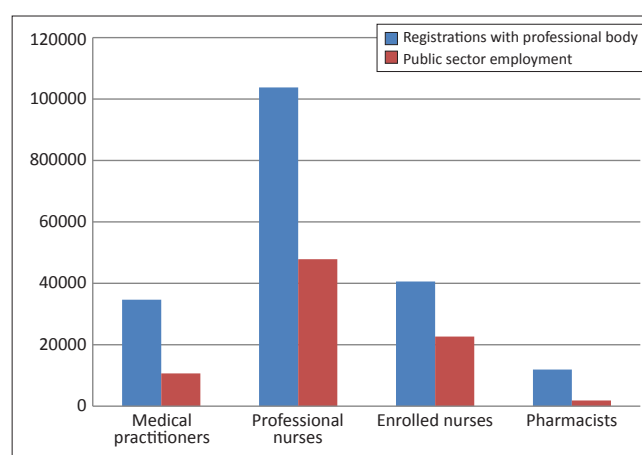
of 20:100 000, which is due in part to the figures including those employed in both the private and public health sectors. However, the provinces with the country's major cities (Gauteng, Western Cape, Free State and KwaZulu-Natal) where private sector facilities are concentrated, had a higher proportion of medical practitioners serving the population than the *rural provinces* (Eastern Cape, Limpopo, Mpumalanga, North West and the Northern Cape). The records indicate worsening of the medical practitioners to people ratio in the majority of the provinces across South Africa (Table 2).

For nurses, however the records present a different picture (Table 3). South Africa had more than the WHO minimum ratio of 120 nurses per 100 000 people. The ratio generally improved in the mid-2000s, but there were still rural-urban disparities.

These contrasts are reflected in the Health Systems Trust's (2009) estimation that 35.7% of health professional posts were vacant in 2008.² An assessment in 2010 revealed high vacancy rates in Limpopo (68%), Eastern Cape (59%) and Free State (47%) (Econex 2010b). However, the rates change over time (Table 4).

There was general improvement between 2002 and 2005, but deterioration thereafter, and marked variation between professions and provinces. For instance, the vacancy rates generally decreased in Gauteng and substantially in two *rural provinces* (Northern Cape and North West) but there was no corresponding decrease with regard to the professions of medical practitioner and professional nurse in Gauteng and medical practitioner in the Northern Cape. Using data from the government's Personnel and Salary Administration

2. Erasmus (2008), (cited in Breier, Wildshut & Mqolozana 2009) analysed vacancies advertised in the *Sunday Times* newspaper between April 2004 and March 2007. It found that nearly one third of the vacancies were for health professionals (17 479), of which the largest category of vacancies was for midwives and professional nurses (44%; 7690 posts), followed by medical practitioners (36%; 5977 public sector posts).



Source: Day and Gray (2008)

FIGURE 1: Number of HRH employed in public sector, 2007 and 2008.

System (PERSAL), national vacancy rates for GPs, specialist doctors, and other health professionals for 2010 were calculated as 49%, 44%, and 42.5% respectively. These figures show that there is a numerical shortage of staff in the public health services, but it is one facet of a broader HRH problem.

Since 2009, the skewed distribution of professional staff between the public and private sectors has been the focus of official attention because of the proposed National Health Insurance (NHI 2009) scheme which would see people being able to use private sector facilities irrespective of income level (Sanders n.d; NHI 2009). Indicators of the disparity are represented and derived from a comparison of numbers of professional staff registered with their respective professional bodies, and the numbers employed in the public sector in 2007 and 2008 (Figure 1).

However, the records also indicate general growth of professional registrations in the country during this decade (Table 5). The table includes different categories of nursing staff. Professional nurses have completed a four-year course

**TABLE 5:** Growth in health professional registrations, 2002–2008.

Professional category	Registrations occurring between 2002–2008							Change from 2002 to 2007 and 2008 in %	Annual average growth in %
	2002	2003	2004	2005	2006	2007	2008		
Medical practitioners	29 903	30 578	31 214	32 198	33 220	34 324	34 687	16.00	2.50
Professional nurses	94 948	96 715	98 490	99 534	101 295	103 792	-	9.30	1.80
Staff nurses	32 495	33 575	35 266	37 085	39 305	40 528	-	24.90	4.50
Nursing auxiliaries	45 426	47 431	50 703	54 650	56 314	59 574	-	31.10	5.60
Pharmacists	-	10 629	10 891	10 824	-	11 547	-	12.00	2.30

Source: NHI 2009

*The registration numbers include a proportion of health professionals that are retired, out of the country, or inactive. The total number of practising health professionals is lower than the total registrations.

either a degree or diploma level. Staff nurses and auxiliary nurses are trained via two-year and one-year training programmes provided by public and private nursing colleges respectively (Subedar 2005).³

Day and Gray (2008) pointed out that the ratios of professional and staff nurses to people in the public health sector had worsened over time. The ratio with regard to professional nurses was 251:100 000 in 1994 but 116.6:100 000 in 2008. With regard to staff nurses, the ratio was 59.7:100,000 in 2001 but 55.4:100 000 in 2008. Wildschut and Mgqolozana (2009) suggested that these different trends indicated inadequate harnessing of the skills and expertise that do exist. For example, they estimated, using South African Nursing Council (SANC) 2009 data, that 17.6% of the registered nurses were inactive at the time and most likely retired out of the profession or working overseas and also that 65% of professional nurses trained between 1997 and 2005 did not appear on the SANC register.

A difficulty for analysis is that key factors, relative lack of skills and their utilisation, tend to be combined in assessments to emphasise the problem as one of numerical shortage. For instance, Wildschut and Mgqolozana's (2009) analysis included three sources of information that combine these indicators. Firstly, the DoH's 2006 *National Scarce Skills List* suggested that the country was short of 14 370 professional nurses (10 250 registered professional nurses and 4120 primary clinical nurses).⁴ Secondly, the DoH's *Operational Plan for Comprehensive HIV and AIDS Care, Management, and Treatment* (DoH 2003) noted the need for the appointment of an additional 13 805 health care staff of whom 4393 should be nurses. Thirdly, the country's Health and Welfare Sector Education and Training Authority (HWSETA) *Draft Sector Skills Plan 2006–2009* recorded that the country was short of 3480 appropriately trained and skilled nurses particularly in the staff nurse and nursing assistant categories. Africa Health Placements, an NGO that recruits doctors to work in rural areas, calculated in a different manner that half of the 2400 medical graduates in 2006 and 2007 would leave the country; that amongst the remaining 1200 doctors, 75% would work

in the private sector, leaving 300 to work in the public sector; and that amongst these 300 doctors, possibly 70 (2.9% of the total graduate number) would work in a rural facility (Bateman 2007).

In summary, calculations by different agencies have used various indicators to make the point that there is a numerical shortage of health care personnel. Consequently, summations do vary. In our report (George *et al.* 2009) we estimated that 19 277 professional nurse posts were vacant in 2008 based on a comparative analysis of the overall vacancy rate of 40.3% (Table 4) (Health Systems Trust 2009) and Day and Gray's (2008) assessment that there were 47 834 professional nurses employed in the public sector in 2008.

We acknowledge that such summations are problematic in view of the variations in the deficit of staff between professions, provinces and health sectors. Notably, the indications of unequal distribution of staff between provinces as well as between the private and public sectors, suggest the significant challenge is generating and retaining an appropriate mix of skills and expertise in the health system. To illustrate, if there are approximately 140 000 to 150 000 professional nurses (Day & Gray 2008) and 15–20% are *inactive* (Wildschut & Mgqolozana 2009), then there are 20 000 to 30 000 nurses who are not in the system; hence, the general figure of a shortage of 19 000 nurses refers more to the inability of the health system to retain them and their skills, than to an absolute numerical lack of such skills. Taking the point further, the absence of 65% of professional nurses who were trained between 1997 and 2005, but who were not professionally registered (Wildschut & Mgqolozana 2009), suggests that possibly another 18 000 to 19 000 nurses were never incorporated into the health system during this decade.⁵ Therefore, the record on the training of professional staff and on the attrition of staff from the health system deserves critical attention.

Training of professional staff

There are eight medical schools and 394 nursing education institutions in South Africa (SANC 2010). The statistical records indicate a steady output of trained staff and, overall, an increase in the numbers of different categories of staff trained each year (Table 6).

3. This article focuses on *professional* and *staff* nurses as a way to avoid the confusion that can arise from use of various terms to be found in the literature. We have followed the terminology used in the *Nursing Act of 2003*, which uses the term *staff* nurses in relation to enrolled nurses. It also uses the term *auxiliary nurse*, though other documents sometimes use the term *nurse assistant*.

4. A primary clinical nurse (PNC) refers to professional nurses (traditionally known as Primary Health Care Nurse) who have the additional post-basic qualification of Diploma in Clinical Nursing Science, Health Assessment, Treatment and Care as recognised by the SANC. (Magobe, Beukes & Müller 2010)

5. Erasmus (2008) records that the annual output of trained professional nurses increased from 2262 to 2371 between 1999 and 2008. We used an average of between 2000 and 2200 per year to derive an approximate total of 18 000 to 19 000 nurses trained between 1997 and 2005 but who were or are not registered.



The number of professional nurses graduating from four-year programmes from nursing colleges and universities with nursing degrees or diplomas was 2494 in 2000 and 2638 in 2009 (SANC 2010). The number of staff nurses trained was 1919 in 2000 and 7493 in 2009, because of the establishment and expansion of nursing training at private colleges.⁶ For the same reasons, the number of nursing auxiliaries trained (via one-year programmes) was 1509 in 2000 and 5779 in 2009 (SANC 2010). The expansion of lower level nurse cadres established a platform for upgrading of skills over time via bridging programmes (Wildschut & Mqolozana 2009).

Nonetheless, these records obscure changes to the mix of skills and expertise amongst nurses. First, there has been no steady annual increase, but simply variable numbers each year, in the number of staff nurses who graduate from the bridging programmes as professional nurses: for example, 1991 in 2000 and 2475 in 2009 (SANC 2010). Consequently, the number of professional nurses emerging from four-year programmes (including nursing degrees and diplomas) and two-year bridging programmes each year has not increased significantly (4485 in 2000 and 5113 in 2009) when viewed in relation to the marked increase in the roles and responsibilities of nurses following the rapid expansion of the ART programme and current efforts to revitalise PHC services.

Secondly, the training system has set up a two-tier division of competence and authority between professional nurses. General health policy is to promote PHC facilities as 'one stop shops', meaning that they are supposed to provide a wide range of health services that includes, for example, delegation of some facets of HIV and AIDS prevention, counselling and treatment to nurses. However, only professional nurses that have had the necessary training are able to initiate HIV-infected patients onto ART (Cameron *et al.* 2012). In other words, South Africa is producing large numbers of nurses but it is not increasing, via training, the number and type of professional nurses who are capable of providing the PHC services required today (and who have the authority to do so).

Furthermore, there is an anomaly between the statistics on the numbers of nurses of all types that are being trained and the SANC (2009) report that a majority of all categories of nurses were over the age of 40 years old: 76% of professional nurses, 57% of staff nurses and 53% of nurse auxiliaries.⁷ The anomaly is that the investment in training professional nurses, staff nurses and bridging training for staff nurses during the last decade, has not resulted in at least a sizeable minority of nurses who are not yet 30 years old nor close to a majority of nurses under the age of 40 years old (assuming that the vast majority enter the profession between the ages of 18 and 20 years old). The intimation is that many newly

6. Private colleges produced 586 staff nurses in 1999 compared to 4366 in 2008. Public institutions produced 2042 staff nurses in 1999 and 1788 in 2008 (SANC 2009).

7. The statistics do not show the proportion of professional nurses (i.e. those with training and authority to practice comprehensive nursing) in relation to staff nurses who have qualified as professional nurses but who are only qualified to practice general nursing.

TABLE 6: Total graduates produced by South Africa medical schools, 1996–2008.

Year	<i>n</i>
1996	1106
1997	1233
1998	1246
1999	1087
2000	1163
2001	1079
2002	1088
2003	1207
2004	1215
2005	1330
2006	1402
2007	1108
2008	1349
Total	21 613

Source: National Department of Education (cited in Department of Health 2006); Eighty20 data cited in Econex, (2010b)
n, Given as number of medical graduates.

TABLE 7: International migration of South African professional health staff.

Health staff	Number practicing abroad between 1998–2000			Total number practicing abroad in 2006
	1998	1999	2000	
Medical practitioners	105	83	105	8921
Nurses and midwives	133	117	147	6844
Other health professionals	110	101	126	7642
Total	348	301	378	23 407

Source: Wadee & Khan (2007).

trained nurses of all types are not being absorbed into the public health services and/or many, if not a majority, do not remain in these services. This intimation raises the issue of staff attrition.

Staff Attrition

There appear to be two primary causes of staff attrition: HIV and AIDS and migration. A nationwide survey of health workers in 2002 estimated that 15.7% of professional staff were HIV positive, that the highest rates (20%) were amongst the 18–35 year olds; and, in terms of numbers, that 2745 nurses were likely to develop AIDS-related illnesses each year (Shisana *et al.* 2004). Connelly *et al.* (2007) reported similar findings with prevalence rates of 13.7% amongst certain nursing cadres. Therefore, it is probable that HIV infection is a significant factor behind the predominance of older (> 40 years old) nurses in public health services.

The emigration of large numbers of professional staff is a well-known phenomenon (Breier & Wildschut 2006; Hamilton & Yau 2004; Sanders & Lloyd 2009). However, migration data is known to be inaccurate because there is no agency that collects standardised data on international flows of people disaggregated by occupation (Breier 2009; Clemens & Pettersson 2008). Wadee and Khan (2007) summarised emigration trends amongst medical practitioners on the basis of DoH figures from 2001 (Table 7).

With regard to net losses, the WHO (2006b) estimated that approximately 37% of South African doctors and 7% of nurses had moved out of South Africa. Wildschut and



Mgqolozana (2009) estimated a 1–2% annual emigration rate amongst nurses which would amount to between 2128 and 4256 nurses.⁸

Discussion

Staff attrition as a result of HIV and AIDS and migration compounds the problem of the unequal distribution of staff between the public and private sectors, as well as offsetting the training and investment in staff. However, it is not possible to measure how this attrition influences the variable growth and decreases in the distribution and registration of health care personnel because the data are so fragmented. For instance, the emigration of between 2000 and 4000 (presumably registered) nurses each year is significant in view of the estimated shortage of 19 000 nurses. However, retention of health care personnel is perhaps the most critical challenge in view of the estimations that 15–20% of South Africa's professional nurses (20 000 to 30 000 individuals) are *inactive* and another 18 000 to 19 000 were never registered (in the early 2000s). Likewise, the annual emigration of between 1000 and 1200 doctors (Mallaby 2004; Bateman 2007) represents a persistent loss of scarce high-level expertise, but the estimated annual recruitment of 900 graduates into the private sector represents failure to capitalise on the investment in training those doctors.

Limitations of the study

This article constitutes a desk-top review of relevant documents primarily pertaining to the training, distribution, vacancies, registrations and emigration of health care workers in South Africa to help assess the relative numerical *shortage* of health care workers in South Africa. It does not attempt to provide a detailed discussion of the reasons for the increase or decrease in health care worker numbers seen in each of these areas. Similarly, the review focused narrowly on cadres of nurses and medical doctors. Other categories of health professionals such as pharmacists, physiotherapists, dentists, occupational therapists and psychologists, crucial to the delivery of health care services, were not included. In terms of the methodology, the researchers included documents (government reports, academic literature etc.) that were electronically available over the internet; thus, information that was not available on the internet was not included in our discussions or calculations.

Recommendations

The DoH and proponents of the NHI should acknowledge that the *shortage* of health care personnel cannot be reduced to meaning insufficient numbers of health care personnel. Thinking in those terms inhibits, for example, consideration of the fact that South Africa has an abundance of nurses. The imperative is to:

- attract and retain the thousands of individuals who have been trained as nurses

8. Migration News (2008), citing a survey by the Southern African Migration Project (SAMP), reported half of South Africa's health professionals planned to emigrate within the next five years, on the basis of 1700 responses from 29 000 doctors, nurses and other health workers.

- to train the type of *professional* nurses who have the skills and authority to manage and deliver the comprehensive PHC services
- to take into account, in training plans, the erosive effect of HIV and AIDS on the composition of the workforce of nurses

Likewise, the *shortage* of doctors is not primarily a numerical problem, but a function of failure to capitalise on the investment in training them. Even if the loss by emigration of half of the annual total of graduates cannot be curtailed, there are still approximately 1200 doctors produced each year who remain in the country. Therefore, if there are adequate incentives, within a few years there should be more than enough practitioners to achieve a sound ratio of doctors to that part of the population that is dependent on the public health services.

For proponents of the NHI, a short-sighted strategy is to increase the number of health care personnel indirectly by enjoining those in the private sector to provide services to the general public. It is a strategy to alleviate the pressure on health care personnel in the public health service, rather than to strengthen the health system as a whole.

Conclusion

The *shortage* of health care personnel refers primarily to inadequate production, harnessing and retention of appropriately skilled health care personnel. Furthermore, it should be seen in terms of a need for regular development of new skills and retention of expertise as a result of a changing burden of disease and, in relation to HIV and AIDS services, changing demands on health care personnel. Therefore, to see South Africa's HRH challenges as a problem of an inadequate number of staff is to focus on the symptoms of the problem.

Our assessment shows that there are significant variations with regard to the increase and decrease over time in the number and distribution of different categories of staff. These variations indicate that the country is reproducing the skills it needs but, in the context of HIV and AIDS and the need for comprehensive skills, not in the right proportions. Staff attrition and poor retention of the skills and expertise compound this problem. One effect is a shortage of staff. However, the substantive challenge is to harness effectively and retain the skills and expertise that exist and are being reproduced and importantly, in the context of a changing and high burden of disease, to ensure that the training of nurses produces the skills that are needed.

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Competing interests

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Authors' contribution

G.G. (University of KwaZulu-Natal) conceptualised the study, interpreted the results and prepared the manuscript. C.R. (University of KwaZulu-Natal) made conceptual contributions, conducted the review and assisted in preparing the manuscript. T.Q. (University of KwaZulu-Natal) made conceptual contributions and revised the manuscript. J.F.A. made conceptual contributions and approved the manuscript.

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